IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/681,497
Applicant	:	Stephen G. Bales
Filing Date	:	October 27, 2003
Title	:	Lignocellulosic, Borate Filled, Thermoplastic Composites
Examiner:		Matthew J. Daniels
Art Unit	:	1732
Docket No.	:	LA 001
Customer No.		000048373

Declaration Under 37 CFR 1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Stephen G. Bales, declare that all the statements made of my own knowledge are true, and that all statements made on information and belief are believed to be true:

1. In October, 1999 I conceived the use of calcium borate as a fungicide in lignocellulosic composites, also commonly known as wood composites (WC's). Based on further investigation, I then conceived of using CB as a fungicide in lignocellulosic thermoplastic composites, commonly known as wood-plastic composites (WPC's), in July, 2000.

1.131 (continued)

2. By October, 2000 an arrangement had been made for WPC samples containing calcium borate to be prepared for testing. In May, 2001 the initial samples had been prepared and placed in Ohio and Florida test sites. In October, 2001 additional WPC samples containing calcium borate were prepared and placed in these test locations.

3. As a result of testing a range of additive loadings, the discovery was made that calcium borate is an effective WPC fungicide. Further, the surprising discovery was made that CB at loadings as low as 2% increases WPC resistance to surface impairment caused by mold growth. This also addressed a long felt need as described in my declaration under 37 CFR 1.132 dated Nov. 22, 2005.

4. I acknowledge that willful false statements and the like are punishable by fine and/or imprisonment, and may jeopardize the validity of the application of any patent issuing therefrom.

17 Hart Lane, Sewell, NJ 08080

Sworn in the State of New Jersey, County of Gloucester

In the State of New Jersey, this 19 day of June, 2006

Witness my hand and official seal.

My Commission Expires: 14 July 2009

Notary Public

GABRIELE S. MASTROBUONO
Notary Public - New Jersey
My Commission Expires July 14, 2009

Boron Oxides, Boric Acid, and Borates
Abstract
Top of Article
1. Occurrence
2. Boron Oxides
3. Boric Acid
4. Solutions of Boric Acid and Borates
5. Borates
6. Sodium Borates
7. Other Alkali Metal and Ammonium Borates
8. Calcium-Containing Borates
9. Other Metal Borates
10. Boron Phosphate
11. Environmental Concerns, General
12. Health and Safety Factors, General
Bibliography
Related Articles

Figures
Tables
Subject categories
Inorganic Chemicals

Other Versions

Boron Oxides, Boric Acid, and Borates

Michael Briggs, U.S. Borax Inc.

Kirk-Othmer Encyclopedia of Chemical Technology

DOI: 10.1002/0471238961.0215181519130920.a01.pub2
Article Online Posting Date: July 13, 2001

«Previous Next»

8. Calcium-Containing Borates

8.1. Dicalcium Hexaborate Pentahydrate

Dicalcium hexaborate pentahydrate, $Ca_2B_6O_{11}\cdot 5H_2O$ or $2CaO\cdot 3B_2O_3\cdot 5H_2O$; formula wt, 411.08; monoclinic; sp gr, 2.42; heat of formation, **−3.469 kJ/mol (− 0.83 kcal/mol)** (125); exists in nature as the mineral colemanite. Its solubility in water is about 0.1% at 25°C and 0.38% at 100°C. Heats of solution have been determined in HCl (125). Colemanite is slowly formed on heating saturated solutions of inyoite, $2CaO\cdot 3B_2O_3\cdot 13H_2O$, or other higher hydrates. Colemanite decrepitates violently at 480°C losing all its water and forming an anhydrous very low bulk density powder (126).

The crystal structure of colemanite has been shown to contain $[B_3O_4(OH)_3]^{2n-}{}_n$ polyanion chains. The structural relationships between colemanite and the other minerals of the series $2CaO\cdot 3B_2O_3\cdot nH_2O$ ($n = 1, 5, 7, 9, 13$), and structural changes accompanying the ferroelectric transition of colemanite have been outlined (127).

8.2. Sodium Calcium Pentaborate Octahydrate

Sodium calcium pentaborate octahydrate, $NaCaB_5O_9\cdot 8H_2O$ or $Na_2O\cdot 2CaO\cdot 5B_2O_3\cdot 16H_2O$; formula wt, 405.23; triclinic; sp gr, 1.95; exists in nature as the mineral ulexite. The compound can be prepared by seeding a solution of 110 g $CaB_2O_4\cdot 6H_2O$, 40 g